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ABSTRACT

Ethnographically derived measures of sibling caretaking were correlated with attentiveness to a peer tutor for 26 kindergarten children in the Kamehameha Early Education Program (KEEP). It was hypothesized that children raised in a sibling caretaking system would be more accustomed to learning from other children than those reared primarily by adults. For both boys and girls, greater male sibcare experience was positively associated with number of seconds on-task in a dyadic peer tutoring session. Regular classroom on-task rate, and measures of ability and achievement were more highly correlated with attentiveness to the peer tutor. The influence of the individual tutor was as great as any other variable considered, including IQ and certainly greater than a child's experience with sibling caretaking. Limitations of the peer tutoring format are discussed briefly. (SE)

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

ABSTRACT

Ethnographically derived measures of sibling caretaking were correlated with attentiveness to a peer tutor. For both boys and girls, greater male sibcare experience was positively associated with number of seconds on-task in a dyadic peer tutoring session. Regular classroom on-task rate, and measures of ability and achievement were more highly correlated with attentiveness to the peer tutor. There were substantial differences among the four tutors as effective foci of attention.

The limitations of the peer tutoring format are discussed. Future research should focus on the economic and educational advantages of peer tutoring.

TECHNICAL REPORT #20

The Relationship of Sibling Caretaking and Attentiveness to a Peer Tutor[1]

Ronald Gallimore Roland G. Tharp

Gisela E. Speidel

The potential benefits of peer tutoring have long been recognized. For example, Horst (1931) reported that honor students in Latin classes successfully served as tutors to 160 fellow students, the majority of whom got better grades. More recently, Harris and Sherman (1973) found increased accuracy in arithmetic problems when students were allowed to work together and were allowed early recess for 90 percent accuracy. DeVries and Edwards (1972a; 1972b) suggest that incidental increases in peer tutoring are a key reason for the effectiveness of a student-teams class organization (DeVries, Muse, & Wells, 1971); Spilerman, 1971).

Sociocultural factors affecting attentiveness to peer tutors have not been widely researched. However, Gallimore, Boggs, and Jordan (1974) suggested that culture and social groups that assign important child rearing functions to sibling caretakers may foster habits of attending to many, rather than to one or two caretakers, as might be the case in fixed role, small nuclear families. Consequently, children accustomed to sibling caretaking may enter school with correspondingly weaker habits of attending to adults relative to peers and sibling. Gallimore, et. al.

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[1]Appreciation is due Steven T. Boggs, David Lam, Larry Loganbill, and Violet Mays for their contributions to this project.

(op. cit.) used this explanation for the high responsiveness of Hawaiian-American students to team-reward classroom organizations, as well as the high rate of attentiveness to peers reported for this socio-cultural group by MacDonald and Gallimore (1971). MacDonald and Gallimore observed relatively high levels of both social and academic peer interactions in elementary and high school classrooms. However, the relationship between sibling caretaking and attentiveness to a peer acting as a tutor has not been directly tested.

In a small, rural Hawaiian-American school, Gaile (1974) found a significant and negative correlation between family size and elementary students' attentiveness to their teachers. Gaile assumed that family size reflected experience in a sibling caretaking system, an assumption supported by data reported in Gallimore, et al. (1974). Thus students from larger families, in which sibling caretaking is at least potentially available, were less attentive to teachers. Whether they were also more attentive to peers in general and to peers functioning as tutors was not established.

The relationship of sibling caretaking and attentiveness to peer tutors is the particular focus of the study reported here. At a more general level the present study is also relevant to the argument that minority culture students will achieve more educationally if classroom practices are adjusted to social and cultural differences (Baratz and Baratz, 1970; Burger, 1972; and Valentine, 1971).

The research question posed there was this: is there a relationship between a child's experience in a sibling caretaking system, and his attentivenessto a peer tutor? Of course, peers are not older

siblings; but we hypothesized that a child raised in a sibling care-taking system will be more accustomed to learning from other children than those raised primarily by adults, and that this custom will have produced a greater orientation to peers than in a non-sibling-care-taking system.

METHOD

The study was conducted at a research and demonstration school (the Kamehameha Early Education Project) located in urban Honolulu. Children attending the school are randomly sampled in such a way to insure representation of the social and ethnic groups in a delimited low income urban area. Approximately 75 percent of the children are Part-Hawaiian while the remaining are children of Anglo, Japanese, Filipino, and Samoan ancestry. Seventy-five percent of the children are from families receiving public assistance, while the remaining 25 percent are from upper-lower and lower-middle class families. Criteria and methods of selection of the children were reviewed by Hawaii State education officials who judged that the results achieved an enrollment characteristic of the local elementary schools.

The program at the research school is based on Hawaii State Department of Education curricula and administrative guidelines. Aside from the extensive research program and an ongoing teacher training and consultation effort, the day-to-day operation departs only slightly from that observed in nearby elementary schools. At the time of the study reported here only a kindergarten class (N=28) had been enrolled, with plans for expansion on a yearly basis to a four year program (k-3).

The children in the present study were all 5-6 years old.

Measurement of Attentiveness to Peer Tutor

Attentiveness to a peer tutor was assessed in the context of a standard Hawaii State curriculum component. The possible benefits of peer tutoring were officially recognized in Hawaii when the public schools adopted the Hawaii English Program (HEP) - a linguistic reading and language development curriculum. A major component of this program is the "stacks." The stacks are a series of progressively more difficult sets of symbols, letters, or words printed on cards. Each set is fastened together with large plastic loops and is mounted on a solid base; the result is a sturdy but portable set of cards that can be serially displayed. T he stimuli are printed on both sides of each card so that two children can see each item as it is displayed. The program prescribes that children who have successfully finished a stack will tutor others who have not. The tutor presents and reads the contents of a blue card to the tutee; then he presents a series of white cards for the tutee to read which might include several presentations of the word on the blue card, interspersed with other words that vary the initial consonant, e.g. cat (blue card), cat, cat, fat, fat, cat, rat, etc. (white cards). The tutor's responsibilities include reading the blue card words, flipping over each card, and judging whether the tutee has correctly responded to each white card. After a tutee finishes a stack he is checked by a teacher before he proceeds to the next in the series. After several stacks have been successfully completed, the child is trained to become a tutor for other children working on stacks. The intent of the program is to move children into the tutor role as quickly

as possible for motivational and academic reasons.

Prior to the present study the stack component had not been introduced into the research school program. To introduce peer tutoring the two highest achieving children in the class worked on stacks with teachers; after quickly demonstrating their mastery of several stacks, the two children were trained as tutors. The first tutors were girls, as were two subsequent tutors who were used as a result of frequent absenteeism of the initial pair. (The absences were certified by physicians to be for medical reasons). Thus data were obtained for 26 children who served in the tutee role. The remaining 2 of the 28 children in the class served as the original pair of tutors. Eventually two tutees served as tutors.

Peer tutoring sessions occurred each morning while the class was in small groups learning centers. During each 60 minute learning center period, each of the tutors tutored three other children. A tutoring session lasted ten minutes, and was begun and ended by the teacher on a signal from the observers. There was at least a ten minute interval between sessions for the tutors.

Each tutoring session was observed by two persons. One observer recorded the total time, and the second recorded the number of seconds the tueee attended to the tutor. Thus the dependent variable - attending to tutor - was expressed as the number of seconds on-task during the ten minute session. The specific observation code was:

On-task: Tutee looks at tutor; tutee looks at "stacks"; tutee looks at anything tutor asked tutee to look at; tutor looks at teacher if appropriate to situation.

Off-task: tutee looks away, at other children around room, etc. for three or more seconds
tutee verbalizes anything unrelated to task, or moves away from area;
tutee calls to teacher when not prompted by the tutor;
tutee assaults tutor or attacks materials.

Whenever the tutee was "on-task" as defined above, the observer started a stopwatch and stopped the watch when the tutee was "off-task." If the tutor behaved inappropriately then this was not included in the recording; in fact, this occurred less than one percent of the time.

The reliability of observation for the two observers was established during training by dividing the number of seconds "on-task" recorded by observer one by the number of "on-task" seconds recorded by observer two and multiplying by one hundred. Two reliability checks were made initially for observations on the two original tutors before the study began and again on the first day of the study. Reliabilities were extremely high: 98 percent for the first two checks and 99 percent for the third.

Each tutee was observed during his first three sessions of experience with the stacks. Tutees were randomly assigned to one of the four tutors for each of the three sessions, but in such a way that no tutee had the same tutor for two consecutive sessions.

Measurement of Sibling Caretaking Experience

Ethnographic notes were collected over a ten month period as part of the project's anthropological research. All contacts and relevant information were noted in family files and were screened by a project anthropologist who summarized materials pertinent to child care.

Two 5-point rating scales were developed to assess the degree of responsibility for child care assumed in general by female and male siblings respectively within each family. Five 3-point filler scales were developed and used to embed the two critical sibcare items.

Two raters with no knowledge of the families and no knowlege of the research hypotheses, rated each family on the seven items using transcripts of the ethnographic summaries. All identifying information was removed except for a description of household membership, i.e., presence/absence of parents, number, age, and sex of siblings and other residents. The reliability of rating was uniformly high; the range of agreement on the rating scales (across all families) between the two raters was from 93 to 100 percent using the method described by Sears, Rau, and Alpert (1965). In addition, some families were more difficult to rate than others, as indicated by an average agreement within families (across all scales) of 86 percent. This figure is obtained by computing the degree of agreement on all scales for each family.

Other Data

As part of the research program of the research and demonstration school, daily classroom observations were routinely collected for each of the children in the present study. This approach is described in detail elsewhere (Lam, Kidoguchi, Gallimore, Tharp, & Speidel, 1974); in brief, each day each child is observed approximately 40 times for on-task (doing work, attending to teacher, etc.), off or between-task (daydreaming, waiting for teachers help, etc.), or disruptive (disturbing others, fighting, etc.). Lam, et. al. (1974) found on-task rate to be positively

correlated with entering (September) IQ, parent occupation level, end of kindergarten Standard English Performance levels, end of kindergarten IQ, and amount of daily work completed correctly. The on-task observations are used as a measure of individual student involvement in school work.

RESULTS

Attentiveness to Peer Tutor

Table 1 presents mean number of seconds on-task (attentive to tutor) for the three observation sessions for 26 student/tutees. The mean number of seconds on-task drops considerably over the three trials, while the within group variability increases dramatically, particularly for boys. There is a considerable adaptation to the task; apparently for some children as the novelty of the peer tutoring situation diminished, so did attentiveness to the tutor. This interpretation is supported by the correlation between the daily classroom observation on-task rate and attentiveness in the peer tutoring context. On trial one of the peer tutoring observation, there was a low correlation between attentiveness to the peer and the daily classroom on-task ($r=$ (24) .21, ns). However, on trials two and three, the correlations were $r=$ .53 (24) and $r=$ .58 (24), $p < .01$ respectively. Thus as the children became more accustomed to peer tutoring, those who were more attentive to the peer were the same students who were over the entire school year more likely to be on-task in the regular classroom situation. Thus trials two and three are likely to be the best measures of more enduring individual tendencies to attend to a peer tutor, while trial one appears to have

TABLE 1

MEAN AND STANDARD DEVIATIONS FOR NUMBER OF SECONDS ON TASK FOR THREE OBSERVATIONS OF ATTENTIVENESS TO PEER TUTOR

	MALES n=12 Mean	Standard Deviation	FEMALES n=14 Mean	Standard Deviation
Observation 1	525.1	79.45	551.0	61.44
Observation 2	520.3	93.24	552.27	45.57
Observation 3	437.2	147.81	506.09	83.93
Overall Mean	494.2	76.61	535.55	52.27

been more influenced by relatively transient factors.

Those children who over the three peer tutoring trials were more attentive were also those with higher posttest (end of kindergarten) Wechsler Preschool and Primary Scale of Intelligence (WPPSI) Verbal and Full Scale IQ scores both r=53 (22), $p < .01$; higher scores at the end of kindergarten (r= .42 (24), $p < .05$) on a measure of Standard English Performance (Day, Boggs, Tharp, Gallimore, & Speidel, 1974); greater WPPSI Verbal IQ change scores (May testing minus Sept.; testing r= .41 (23), $p < .05$); and greater Metropolitan Readiness Test Change scores (r= .53 (22), $p < .01$). Thus those who attended to the peer tended to be the brighter, more verbal children, those who showed significant gains over the Kindergarten school year.

Sibcare and Attentiveness to Peer Tutors

Table 2 presents the correlations between attentiveness to peer tutoring and the ethnographic ratings. Data for male and female tutees are presented separately.

Degree of male sibcare responsibility correlated with attentiveness to peer tutor during sessions two and three for boys, and during session three for girls. However, female sibling childcare responsibility did not significantly correlate with any tutoring trials for either sex.

Finally, there was a very significant tutor effect. Two of the four girls who served as tutors were attended to more than the other two. The differences are quite large, ranging on trial 3 from a mean

TABLE 2

KENDALL RANK ORDER CORRELATIONS OF SIBCARE MEASURE AND ATTENTIVENESS TO PEER TUTOR

Attentiveness to Peer Tutor	SIBCARE MEASURES: Ethnographic Ratings			
	Male Sibs		Female Sibs	
	Boys (N=12)	Girls (N=14)	Boys (N=12)	Girls (N=14)
Session #1	0.00	.17	.20	.10
Session #2	.72***	.26	-.10	.14
Session #3	.56***	.40***	.15	.10
Average: all sessions	.61***	.40***	.31	.18

**p <.05
***p <.01

of 389 seconds for one tutor (N=7 tutees) to a mean of 543 seconds for another tutor (N=10 tutees). In short, the influence of the tutor was as great as any other variable we considered, including IQ and certainly greater than a child's experience with sibling caretaking.

DISCUSSION

It is surprising to find that the hypothesized relationships obtain to some degree (for both boys and girls) vis-a-vis caretaking-by-male-sibs, but not caretaking-by-female sibs. Since the tutors were all female, one might have expected stimulus generalization to have produced the opposite effect. The probably explanation lies here: ordinarily boys are pressed into caretaker service only when the girl sibs cannot manage it all (Gallimore, Boggs, and Jordan, 1974). Thus a high degree of male sib responsibility may index a quantum jump in extended caretaker organization of the family. Therefore, a family in which boys participate heavily in child care is very strongly oriented toward sibling interaction.

Whether or not this is a correct assumption, the most impressive features of the data are the limited importance of childcare conditions to peer tutor attention. In support of this contention, we may list the following: 1) During the month in which the study was conducted, the four boys with maximum sibcare experience averaged 94 percent on task as measured by daily observation; during the peer tutoring sessions these same boys were on task 85 percent of the time. This hardly argues that high sib care children have particular peer-oriented attention tendencies. 2) Attentiveness to the peer was positively related to

intelligence, fluency in English, and general academic improvement during the school year. 3) The greatest source of attentiveness variance is the tutors themselves all of whom were girls, but among whom there were wide differences as effective foci of attention.

While our data do demonstrate one feature of child care which influences peer-tutoring receptivity, these effects are minor as compared with other non-familial variables. Methods used by the research school staff to increase attentiveness, e.g., contingent social reinforcement, would appear to be a much more economical method than revamping an entire curriculum to feature peer tutoring. The training of tutors, and the training of general school-attentiveness and receptivity, apparently override a child's initial disposition toward peer orientation.

It is certainly possible that peer-tutoring programs will demonstrate merits justifying their continued use. Potential merits include economy and educational advantage. Our data suggest, however, that increased student attentiveness is not a likely advantage of peer tutoring over other instructional formats. It also appears doubtful that peer tutoring will yield specific motivational benefits for particular sociocultural groups.

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